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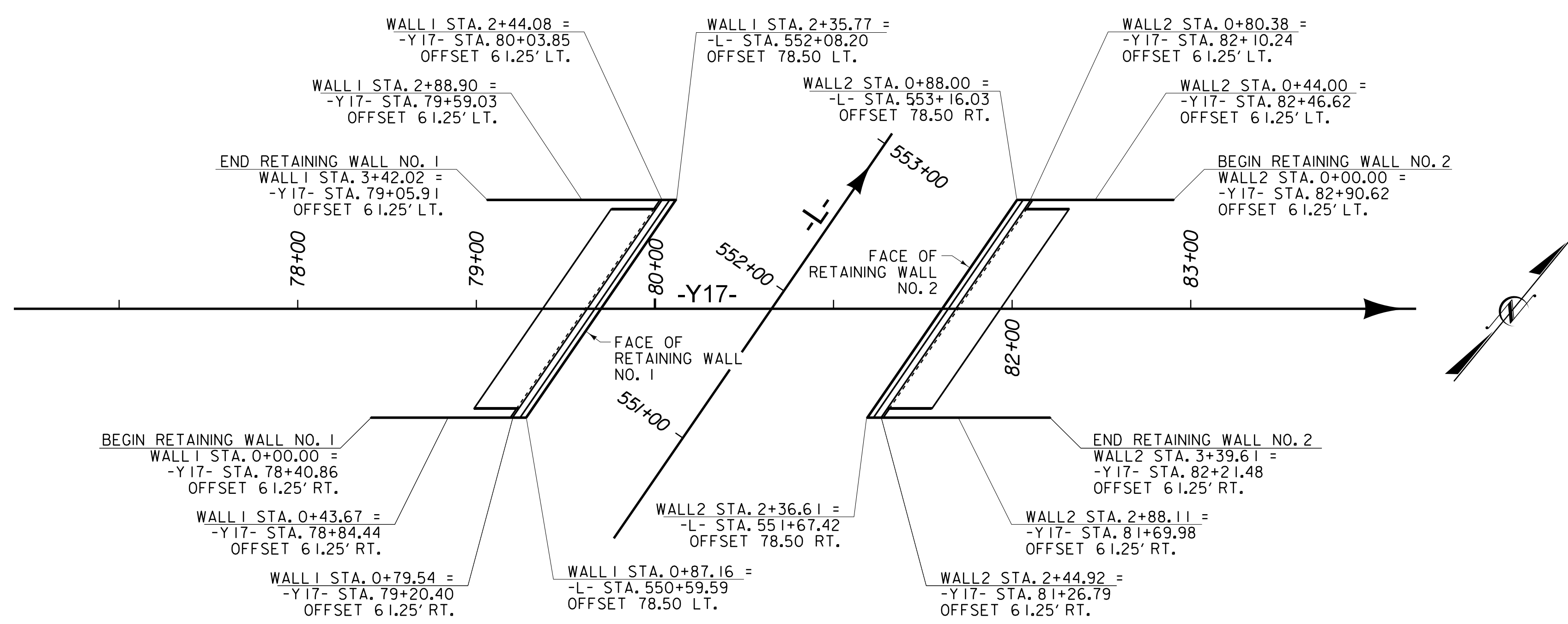
GEOTECHNICAL ENGINEER

ENGINEER

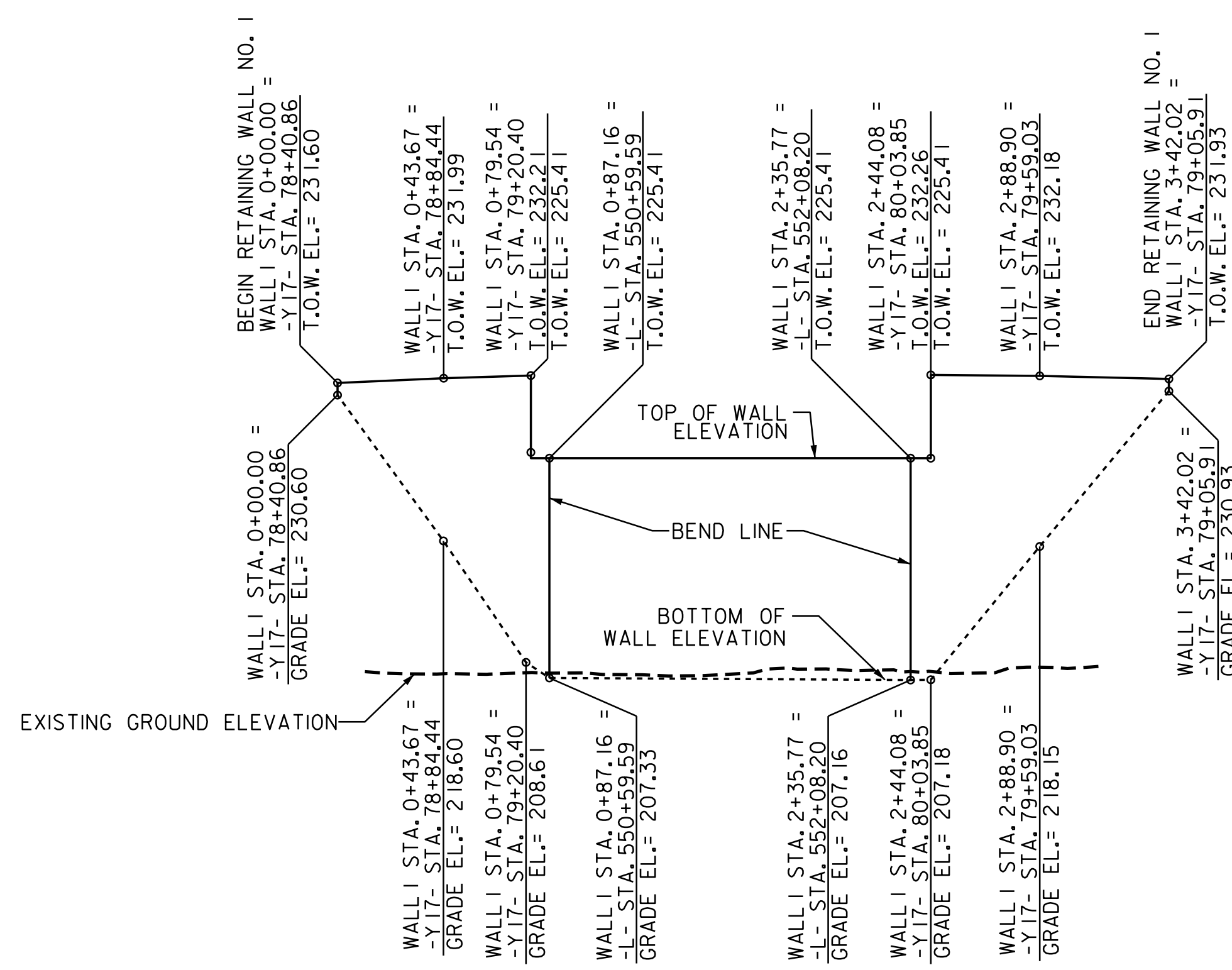
DocuSigned by:
Thei Tan Zan 6/11/2018

Signature: _____ Date: _____

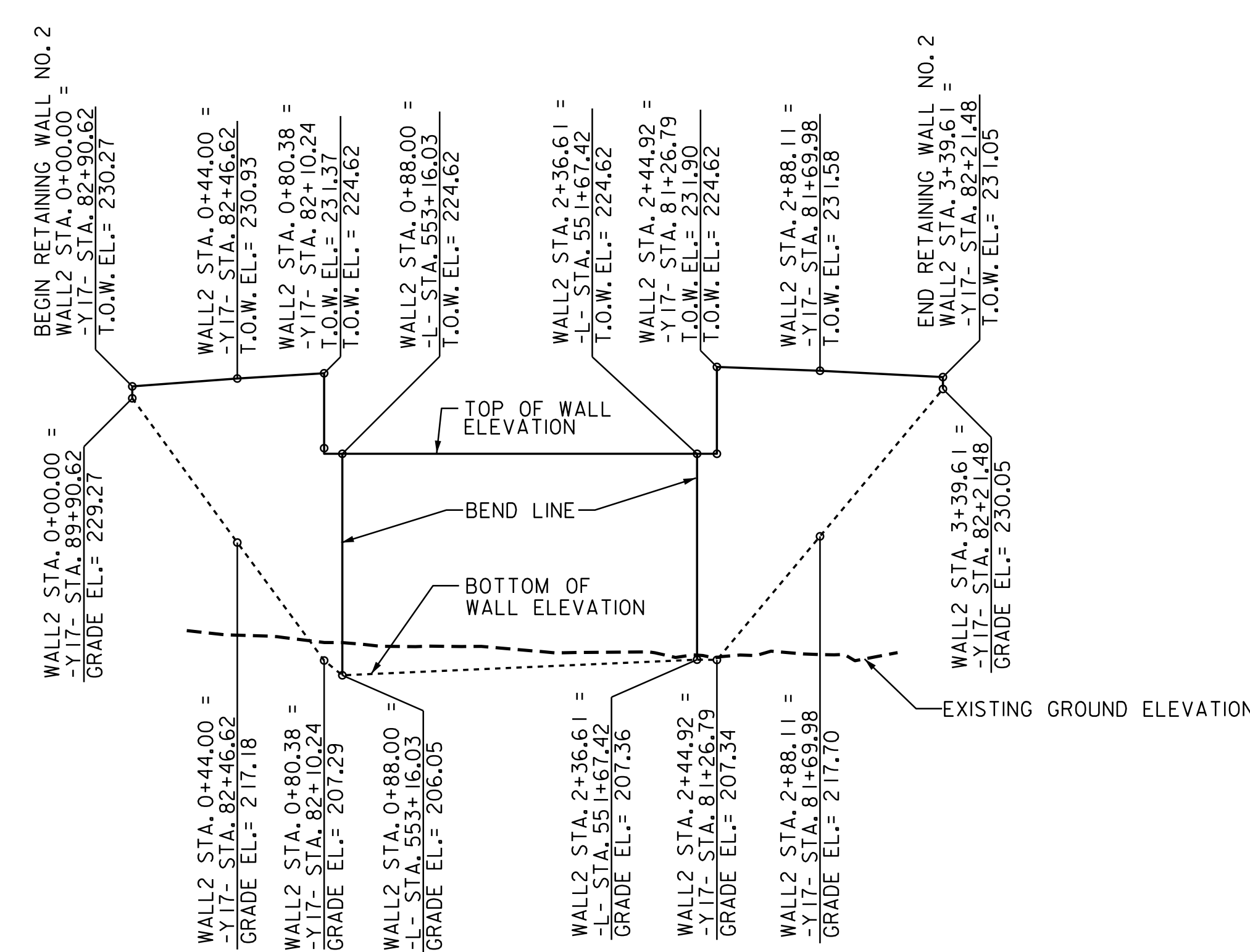
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RETAINING WALL NO.1 & NO.2 PLAN VIEW
NOT TO SCALE

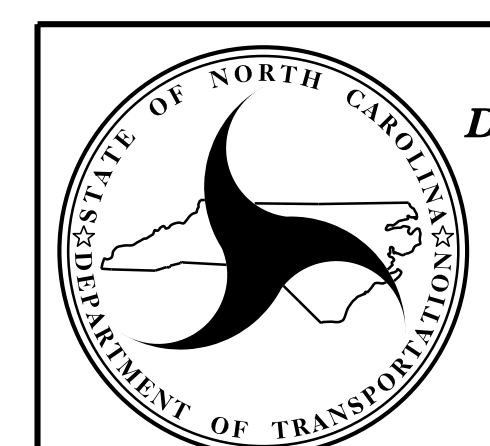


RETAINING WALL NO.1 WALL ENVELOPE
NOT TO SCALE



RETAINING WALL NO.2 WALL ENVELOPE
NOT TO SCALE

ESTIMATED MSE WALL QUANTITIES (SQUARE FEET)	
MSE RETAINING WALL NO. 1	5,250 SF
MSE RETAINING WALL NO. 2	5,170 SF



**NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

**GEOTECHNICAL
ENGINEERING UNIT**

PROJECT NO.: U-2519BB
CUMBERLAND COUNTY
STATION: 80+65.32 -Y17-, 551+87.81 -L-
SHEET 1 OF 4

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	T. T. ZAN	6/11/18	3	-	-	W-1
2			4			

PREPARED BY: T. T. ZAN DATE: 4/2018
REVIEWED BY: J. BATTS DATE: 4/2018

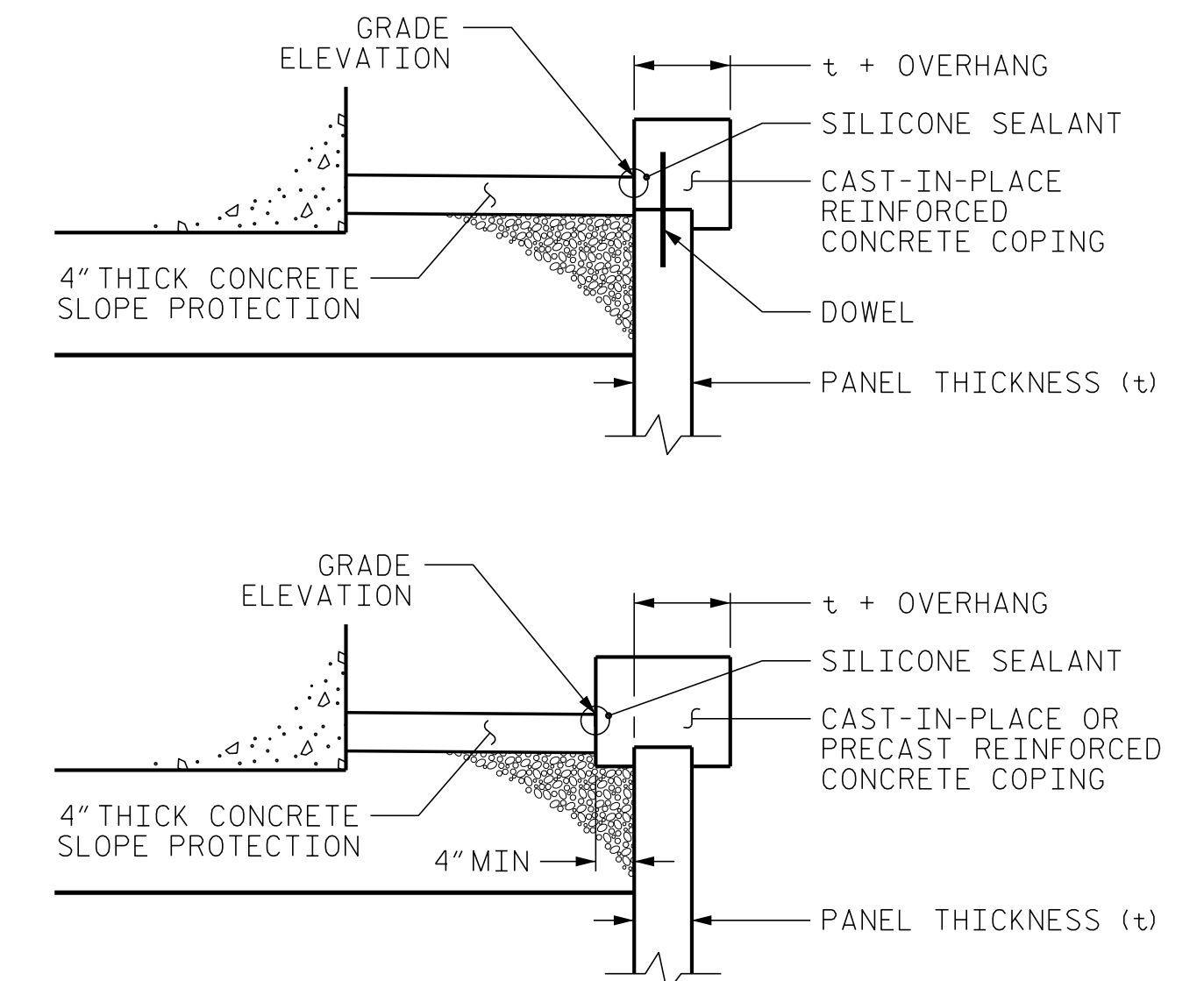
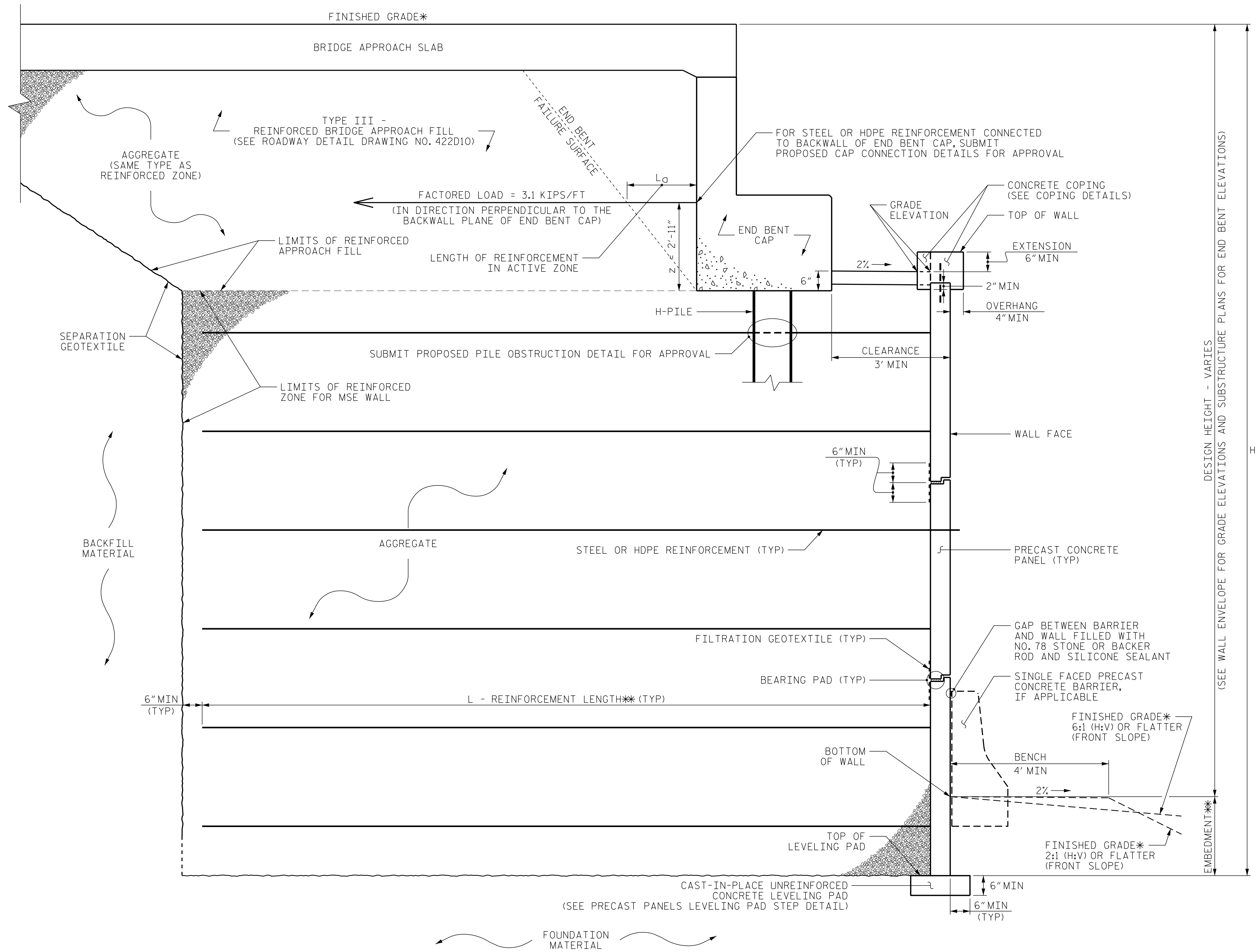
GEOTECHNICAL ENGINEER
 ENGINEER

DocuSigned by:
 Thein Tan Zan 4/26/2018

SEAL
 030943
 ENGINEER
 THEIN TAN ZAN

DATE: 4/26/2018
 SIGNATURE: _____ DATE: _____

**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**



COPING DETAILS
 AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.

MSE ABUTMENT WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
 **SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.

PROJECT NO.: U-2519BB
 CUMBERLAND COUNTY
 STATION: 80+65.32 -Y17-, 551+87.81 -L-
 SHEET 2 OF 4

**NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS**

**GEOTECHNICAL
 ENGINEERING UNIT**

**RETAINING WALL NO. 1 & NO. 2
 TYPICAL SECTION & DETAILS**

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	W-2
2	-	-	4	-	-	

PREPARED BY: T. T. ZAN	DATE: 4/2018
REVIEWED BY: J. BATTS	DATE: 4/2018

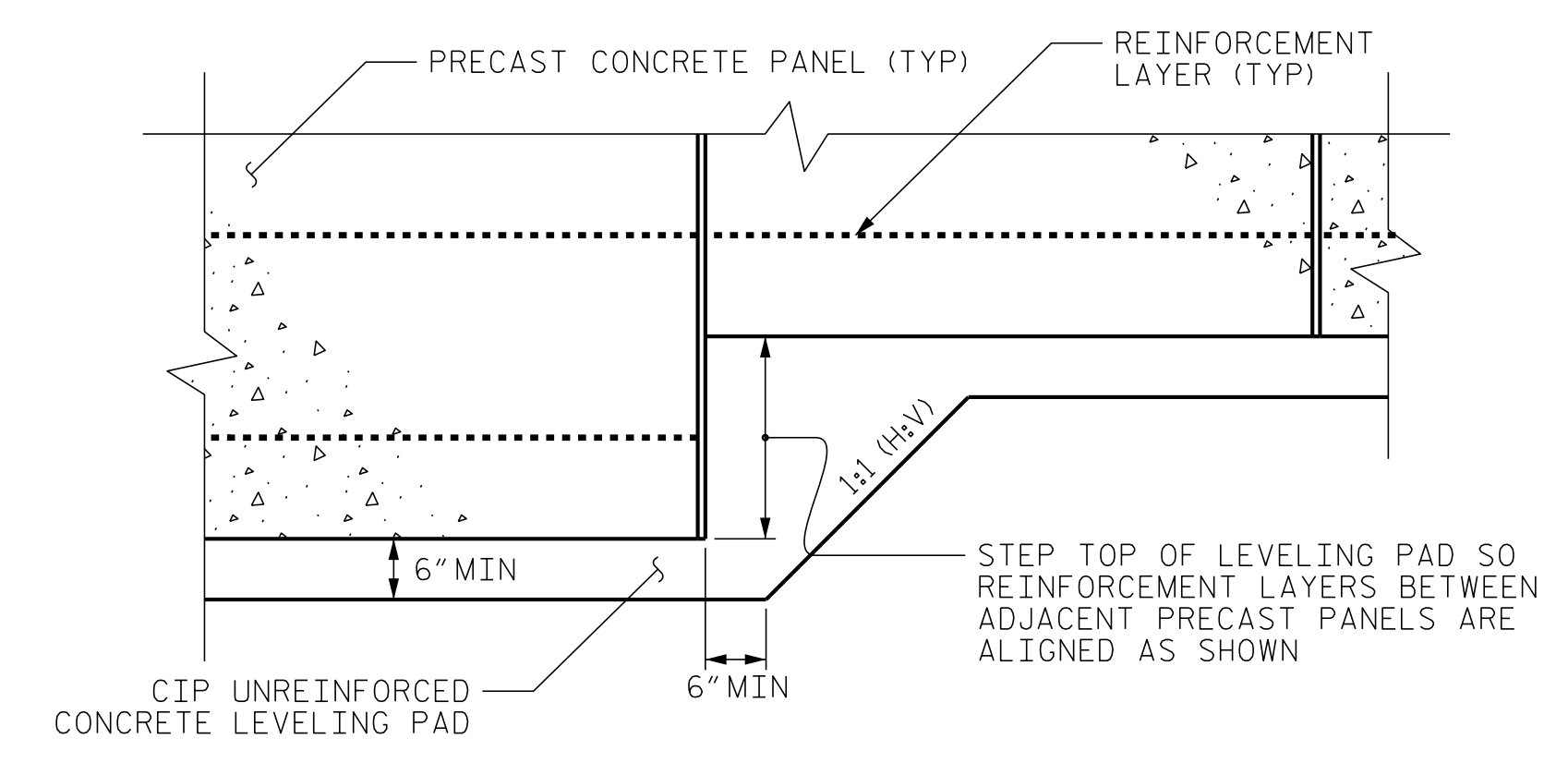
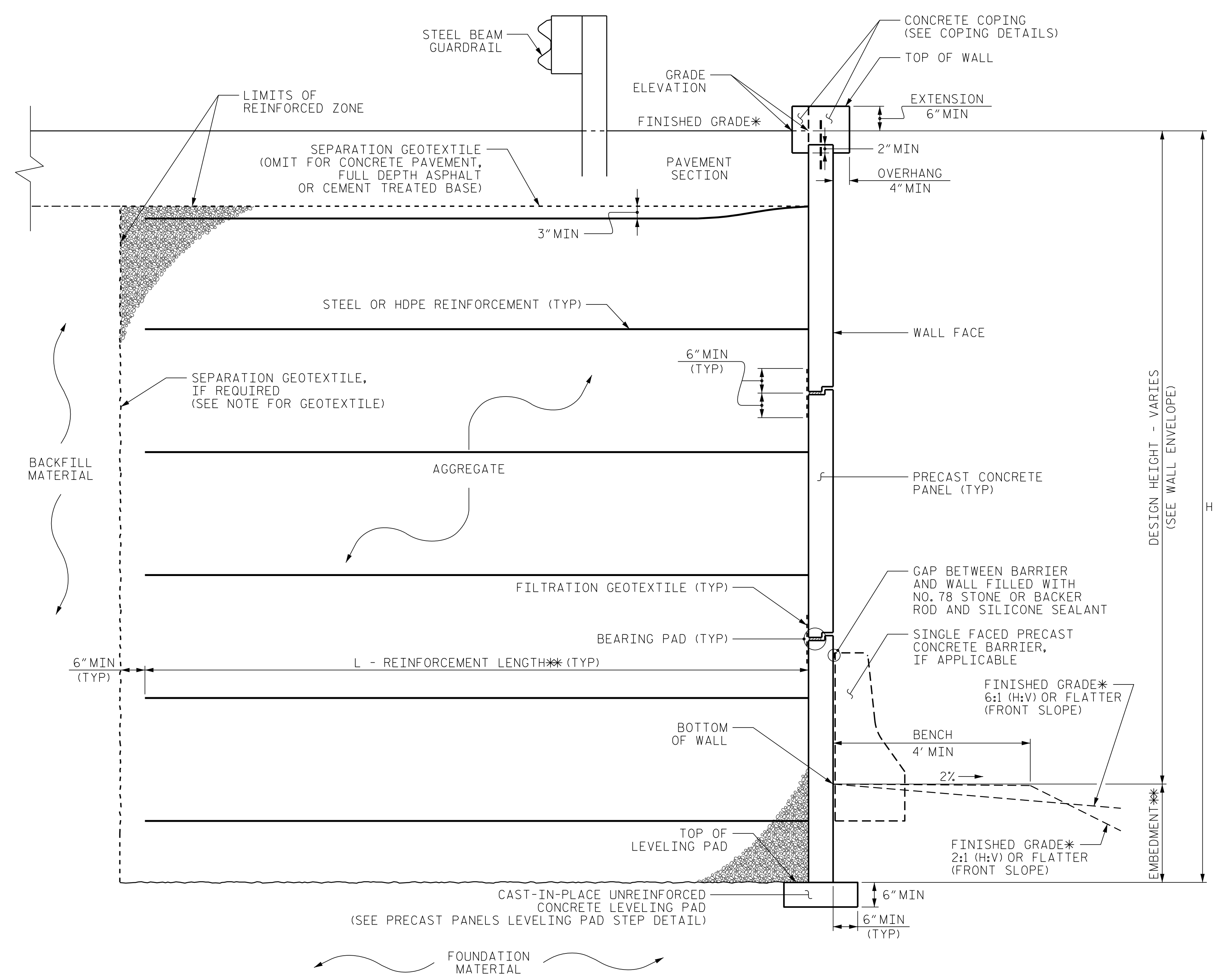
GEOTECHNICAL ENGINEER

ENGINEER

DocuSigned by:
Thein Tan Zan 4/26/2018

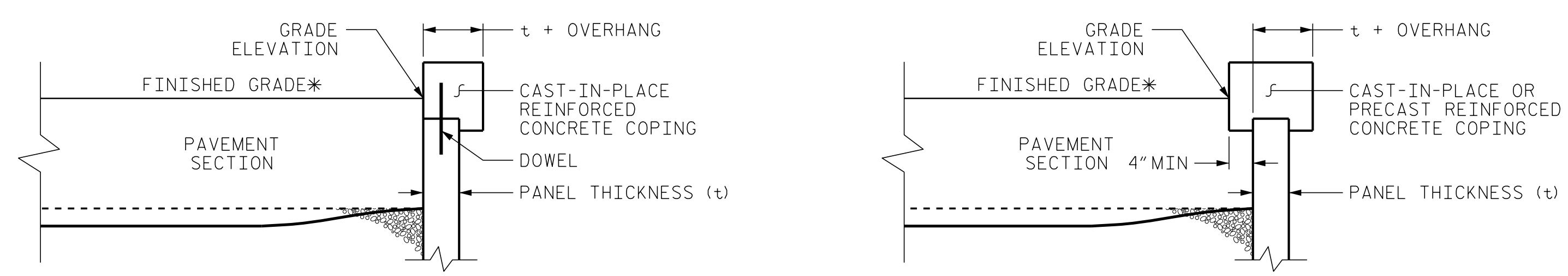
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UNLESS ALL SIGNATURES COMPLETED**



MSE WALL WITH PRECAST PANELS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL NOTES FOR EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



COPING DETAILS

AT THE CONTRACTOR'S OPTION, CONNECT COPING TO PANELS WITH DOWELS OR EXTEND COPING DOWN BACK OF PANELS.
*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.

PROJECT NO.: U-2519BB
CUMBERLAND COUNTY
STATION: 80+65.32 -Y17-, 551+87.81 -L-
SHEET 3 OF 4

**NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

**GEOTECHNICAL
ENGINEERING UNIT**


**RETAINING WALL NO. 1 & NO. 2
TYPICAL SECTION & DETAILS**

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	W-3
2	-	-	4	-	-	

PREPARED BY: T. T. ZAN DATE: 4/2018
REVIEWED BY: J. BATTS DATE: 4/2018

GEOTECHNICAL ENGINEER

ENGINEER



DocuSigned by:
Thein Tun Zan 4/26/2018

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SIGNATURE DATE SIGNATURE DATE

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NOTES:

FOR MECHANICALLY STABILIZED EARTH (MSE) RETAINING WALLS, SEE MECHANICALLY STABILIZED EARTH RETAINING WALLS PROVISION.

FOR TYPE III REINFORCED BRIDGE APPROACH FILL, SEE BRIDGE APPROACH FILLS PROVISION AND ROADWAY DETAIL DRAWING NO. 422D10.

FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.

FOR SINGLE FACED PRECAST CONCRETE BARRIER, SEE ROADWAY PLANS AND SECTION 857 OF THE STANDARD SPECIFICATIONS.

A SEPARATION GEOTEXTILE IS REQUIRED AT THE BACK OF THE REINFORCED ZONE FOR RETAINING WALL NO.1 AND NO.2.

A DRAIN IS NOT REQUIRED FOR RETAINING WALL NO.1 AND NO.2.

BEFORE BEGINNING MSE WALL DESIGN FOR RETAINING WALL NO.1 AND NO.2, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN RETAINING WALL NO.1 AND NO.2 FOR THE FOLLOWING:

- 1) H = DESIGN HEIGHT + EMBEDMENT
- 2) DESIGN LIFE = 100 YEARS
- 3) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 5,750 PSF
- 4) MINIMUM REINFORCEMENT LENGTH (L) = 0.8H OR 6 FT, WHICHEVER IS LONGER

5) REINFORCED ZONE AGGREGATE PARAMETERS:

AGGREGATE TYPE*	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
COARSE	110	38	0

*SEE MSE RETAINING WALLS PROVISION FOR COARSE AGGREGATE MATERIAL REQUIREMENTS.

6) IN-SITU ASSUMED MATERIAL PARAMETERS:

MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
BACKFILL	120	30	0
FOUNDATION	120	30	0

DESIGN RETAINING WALL NO.1 AND NO.2 FOR A LIVE LOAD (TRAFFIC) SURCHARGE.

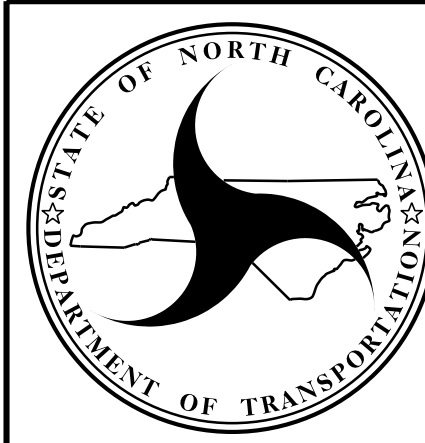
DESIGN REINFORCEMENT CONNECTED TO END BENT CAPS FOR FACTORED LOAD AND LENGTH OF REINFORCEMENT IN ACTIVE ZONE (L_d) SHOWN. CAST REINFORCEMENT OR CONNECTORS INTO CAP BACKWALL FOR END BENT NO.1 LOCATED AT STATION 79+60.91 -Y17-, AND END BENT NO.2 LOCATED AT STATION 81+69.73 -Y17-, MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN REINFORCEMENT OR CONNECTORS AND REINFORCING STEEL IN CAP.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.1 AND NO.2.

FOUNDATIONS FOR END BENT NO.1 LOCATED AT STATION 79+60.91 -Y17- AND END BENT NO.2 LOCATED AT STATION 81+69.73 -Y17- MAY INTERFERE WITH REINFORCEMENT FOR RETAINING WALL NO.1 AND NO.2. SEE "FOUNDATION LAYOUT" SHEET FOR FOUNDATION LOCATIONS.

DO NOT PLACE LEVELING PAD CONCRETE, AGGREGATE OR REINFORCEMENT FOR RETAINING WALL NO.1 AND NO.2 UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.

PROJECT NO.: U-2519BB
 CUMBERLAND COUNTY
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 SHEET 4 OF 4



**NORTH CAROLINA
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DIVISION OF HIGHWAYS**

**GEOTECHNICAL
ENGINEERING UNIT**

**RETAINING WALL NO.1 & NO.2
NOTES**

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1	-	-	3	-	-	W-4
2	-	-	4	-	-	

PREPARED BY: T. T. ZAN	DATE: 4/2018
REVIEWED BY: J. BATTS	DATE: 4/2018